



Electrochromic Windows with Dynamic Controls

What is this Technology?

In response to a small amount of applied voltage, electrochromic (EC) windows transition through variable tint levels to optimize daylighting while reducing glare and solar heat gain. Dynamic controls enable these EC windows to adapt automatically to changing external conditions, such as temperature and direct sunlight, and also respond to user preferences via wall switches or web-based applications. EC windows can be configured for specific space types, such as open offices or conference rooms, and have the capability to learn use patterns over time.

Why is GSA Interested?

EC windows offer increased efficiency over even the most advanced incumbent glazing technology because of their ability to dynamically adjust solar heat gain to match the demands of changing environmental conditions. In addition to increased energy efficiency, EC windows can improve occupant satisfaction by providing access to natural light and views while increasing thermal comfort and eliminating glare.



ENERGY EFFICIENCY The manufacturer estimates that these EC windows will provide annual energy savings of approximately 20%, and peak load savings of more than 25% over advanced low-e glazing.



COST-EFFECTIVENESS This technology is in an early stage of commercialization and currently has higher first costs than other energy-efficient window technologies, though higher costs may be offset by HVAC or lighting energy savings. Potential savings are greatest for buildings where blinds are eliminated and electric light can be dimmed in response to daylight.



OCCUPANT SATISFACTION The ability of EC windows to eliminate glare and better control temperature near windows is important for the technology's success and will be evaluated during the study.



OPERATIONS & MAINTENANCE EC windows fit into the existing glazier supply chain, which reduces the complexity and risk of installation and operation. Because it has no moving parts, the technology does not require any additional maintenance above that of standard windows. The window's ability to adjust tint automatically according to location, space type, weather, and user preference has the potential to reduce temperature control issues and the maintenance required to remedy them.



DEPLOYMENT POTENTIAL The technology is applicable across a wide range of climate zones and building types. It is also equally suitable to both new construction and retrofit applications.

The Green Proving Ground program has commissioned Lawrence Berkeley National Laboratory to perform real-world measurement and verification of EC windows with dynamic controls in a pilot installation in a federally-owned building. Findings from the evaluation are anticipated to be available in 2016.



The Green Proving Ground program leverages GSA's real estate portfolio to evaluate innovative sustainable building technologies. The program aims to drive innovation in environmental performance in federal buildings and help lead market transformation through deployment of new technologies.